

Errors in Reporting Cancer and Other Conditions by Persons in a Prospective Study

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WHEN INFORMATION about a respondent's medical history is obtained by interview, reliance is placed on his memory and motivation to recall past events. Although it is generally recognized that there will be some inaccuracies in such reporting, it is often impossible to document the degree of accuracy of medical histories in an epidemiologic or survey study, especially the past hospitalizations for specific conditions. Because of this apparent limitation, our study was an attempt to verify the accuracy of medical histories by a systematic review of the past hospital records of a group of men who were interviewed in a long-term prospective investigation of heart disease and cancer.

Investigation of previous methodological studies (1-6) has revealed limitations in morbidity data obtained by interviews as compared with hospital records, reports from physicians, or findings from medical examinations. In these studies, the event of record and the interview usually occurred within 1 year of each other. In our study, we were able to evaluate the accuracy of medical histories for events that occurred many years before the interview.

Methods

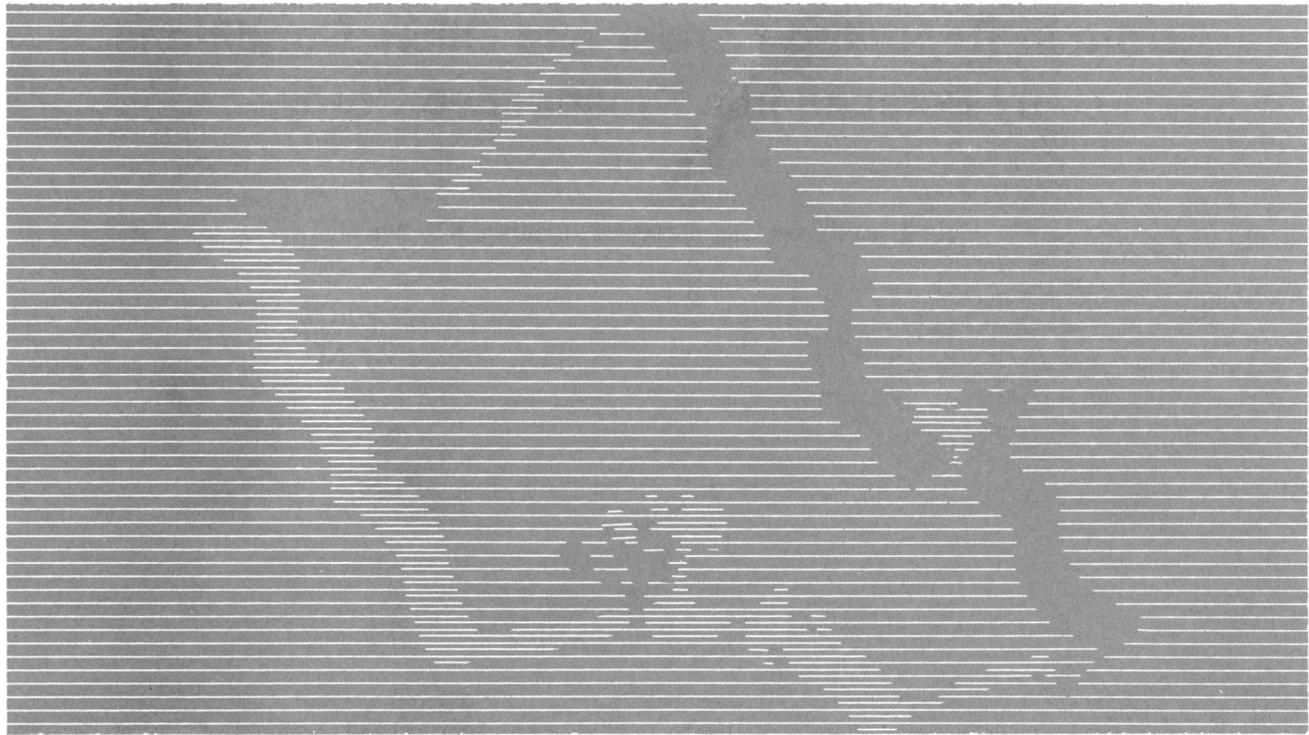
In the Honolulu Heart Study and the Japan-Hawaii Cancer Study, 6,860 men of Japanese ancestry on the island of Oahu were interviewed and examined from November 1971 to April 1975. Of this group of men, 553 were admitted to an Oahu hospital from 1972 through 1973 and identified by our surveillance staff.

They were hospitalized because of cancer, cardiovascular diseases, or gastrointestinal conditions, or they had electrocardiograms (ECGs) while in the hospital.

To identify these hospitalized men, born between 1900 and 1919, our surveillance team reviewed the discharge rosters of all the general hospitals on the island for 1972 and 1973. The four major civilian hospitals, accounting for more than 90 percent of the hospital admissions of the men, subscribe to the Professional Activity Service (7). This service produces a semiannual computer printout of all discharges and indicates race, sex, age, discharge diagnoses, and whether an ECG was taken. This printout facilitated our surveillance operation.

The appropriate hospital records were systematically reviewed. If the 1972-73 hospital charts showed that a subject had an earlier admission for a disease or condition of interest, the records from the previous hospitalization were also reviewed. The conditions reported from the hospital records were based on discharge diagnoses, operative notes, pathol-

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ogy reports, or radiological findings. The information from each hospital record was then compared with the subject's responses during the interview. Only hospitalizations for diseases of interest that occurred any time before the interview date were included in this analysis.

During the interviews, conducted by physicians, the men were asked detailed questions about their medical histories. Particular emphasis was placed on neoplasms and the gastrointestinal tract. The interviewers asked the men if they had ever had peptic ulcer, gallbladder disease, polyps of the large bowel, diverticular disease, specific types of cancer, and other conditions. If the respondent reported a history of a particular disease, the following information was obtained: name of physician, name of hospital or clinic, year of event, and year and place of surgery, if performed. The interviewer did not know a priori if respondents already had a condition of interest. (Copies of the questionnaire are available from the authors upon request.)

Results

We compared the hospitalized men ($N=553$) with the rest of the interviewed population ($N=6,307$) by age and smoking history. At the time of the interviews, 57 percent of the hospitalized men and 45 percent of the others were age 60 or older. As expected,

more of the hospitalized men (75 percent) had smoked cigarettes than the other interviewees (67 percent).

The accuracy of reporting past medical conditions varied according to the diseased state, as shown in table 1. Column (a) includes men whose hospital records showed a particular condition, and column (b) enumerates those who did not have the condition. The percentage of positive hospital reports for cancerous conditions that were supported by the interview history, column (c), ranged from a low of 50 percent for stomach and renal cancer to a high of 77 percent for colorectal cancer. For all cancers combined, only 40 men whose cancer was documented in their previous hospital records stated that they had the specific condition; 21 did not give an accurate medical history for cancer. For the 61 documented cancer patients, the average interval from the date of diagnosis to the date of interview was 2.3 years, with a range of 2 months to 17 years.

In contrast, there was good agreement between the interview history and hospital records for information on surgery for gallbladder disease or peptic ulcer. All 43 patients with surgery of the gallbladder documented in their hospital records reported this surgery in the interviews. A hospital record of gallbladder surgery was not found for any of the 508 subjects who did not give a history of the surgery.

Of 76 subjects who had surgery for peptic ulcer, 71 reported their past surgical procedure. On the other hand, many subjects who had diverticulosis or surgery for colorectal polyps did not give a positive history for these conditions. For these patients with documented noncancerous conditions, the average interval from date of event to the date of interview was 6.9 years, with a range of 1 month to 22 years.

The percentage of histories confirmed by surveillance records is also given in table 1, column (d). Only 50 percent of reported pulmonary cancer patients (2 of 4) and colorectal polypectomy patients (13 of 26) had their histories confirmed by the hospital records. Reasons are presented in table 2 for the lack of confirmation by the surveillance search of the histories reported for various conditions. The hospital records of the two men who said they had

developed pulmonary cancer showed diagnoses of thymic cancer and laryngeal cancer. In four instances a man reported that he had a malignant disease, but the hospital record revealed that he had a benign condition. Likewise, nine patients said they had a benign entity that was shown as a cancerous condition in the hospital record.

A special effort was made to confirm the histories of the eight men whose records were not located. Because of probable errors in reporting dates or hospitals, the search was unsuccessful. Furthermore, these respondents may have reported conditions that they did not have.

Discussion

This study has some features in common with three earlier reports that compared interview information

Table 1. Medical history obtained by interviews with 553 men, compared with their hospital records for neoplasms and selected conditions

Interview history	Hospital record		Percentage positive hospital records supported by history (c)	Percentage positive histories confirmed by hospital records (d)
	Yes (a)	No (b)		
Malignant neoplasms				
Colorectal:				
Yes	24	2	77 (24 of 31)	92 (24 of 26)
No	7	520		
Gastric:				
Yes	6	2	50 (6 of 12)	75 (6 of 8)
No	6	539		
Pulmonary:				
Yes	2	2	67 (2 of 3)	50 (2 of 4)
No	1	548		
Prostatic:				
Yes	4	1	57 (4 of 7)	80 (4 of 5)
No	3	545		
Renal:				
Yes	4	0	50 (4 of 8)	100 (4 of 4)
No	4	545		
Selected conditions				
Surgery for gallbladder disease:				
Yes	43	2	100 (43 of 43)	96 (43 of 45)
No	0	508		
Surgery for peptic ulcer:				
Yes	71	9	93 (71 of 76)	89 (71 of 80)
No	5	468		
Colorectal polyp surgery:				
Yes	13	13	76 (13 of 17)	50 (13 of 26)
No	4	523		
Diverticulosis:				
Yes	7	1	30 (7 of 23)	88 (7 of 8)
No	16	529		

Table 2. Condition reported by subjects but not confirmed by hospital record

Condition reported by subject	Diagnosis, hospital record	Number of subjects
Malignant neoplasms:		
Colorectal	Rectal polyp	1
	Rectal nodule	1
Gastric	Peptic ulcer	1
	Colorectal cancer	1
Pulmonary	Cancer of thymus	1
	Cancer of larynx	1
Prostate	Benign prostatic hypertrophy	1
Selected conditions:		
Surgery for peptic ulcer	Gastric cancer	5
	Gastric polyp	1
	Surgery with no peptic ulcer	2
	Prostate cancer	1
Surgery for gallbladder disease	Record not located	2
Colorectal polyp surgery	Colorectal cancer	3
	Hemorrhoids	4
	Rectal nodule	1
	Records not located	5
Diverticulosis	Record not located	1

with an independent source of medical data. A study by the Institute for Social Research of the University of Michigan also asked respondents to report past hospitalizations, but it requested, in addition, information on other members of the family (1). Hospitalizations were limited to the year preceding interview. All 44 subjects with known gallbladder disease had a confirmatory history for their condition, and 25 of 31 (81 percent) known peptic ulcer patients had a positive history for their hospitalizations. For patients with malignant neoplasms, 89 percent of 59 reported their hospitalization during the interview.

In a separate study by the Division of Research and Statistics of the Health Insurance Plan of Greater New York, subjects were asked to give their own medical histories, as was done in our study, but the interview information was compared with physician's reports instead of hospital records (2). The subjects selected for the study had received medical care within 12 months of their interview. Of 23 persons who had gallbladder disease, 16 (70 percent) gave a positive history for their condition, and 27

(73 percent) of 37 persons with known peptic ulcer gave a confirmatory history of their condition.

A third study in Newfoundland was limited to known cancer patients, who were interviewed up to 12 years after their diagnoses (8). The cancer sites were limited to the lip, oral cavity, and the skin of the head and neck. Three types of questions were used in their survey questionnaire—open-ended, general prompting, and multiple choice followup. The percentage of underreporting was highest for the open-ended questions. The general prompting questions, closest to the type of question used in this study, had an underreporting range of 13 to 47 percent, depending on the site of the cancer.

In accordance with the findings from the previously cited studies, it is noteworthy that the history of surgery for peptic ulcer or gallbladder disease was accurate in our study, although the operation may have taken place many years ago. This result was expected, because both procedures and the accompanying stress usually make a vivid impression on the patient. The history of diverticulosis or surgery for colorectal polyps was not as accurate, probably because these conditions do not cause as many clinical problems as peptic ulcer or gallbladder disease. Furthermore, some of the polyps were removed by a localized procedure.

The history of cancerous conditions was less accurate than expected, although they are usually accompanied by major surgical procedures. Only 65.6 percent (40 of 61) of the persons whose cancer was documented in the hospital record stated accurately that they had the specific condition. The reasons for the discrepancies are not clear. In certain situations the next-of-kin rather than the patient may have been informed of the cancerous condition. Five of the gastric cancer patients said they had surgery for peptic ulcer, and three colorectal cancer patients stated that their surgery was for colorectal polyps.

The reasons for the errors in reporting cancer and other conditions need further investigation. The respondent may not have understood the question, or the interviewer may not have properly presented the question, or may have misinterpreted the response. The subject could have forgotten a past surgical procedure or could have misunderstood his physician regarding his condition. On the other hand, the respondent may have avoided giving an accurate response because of possible embarrassment or denial of the presence of a known disease. The possibility also existed that the subject was not interested in the questions and did not make an effort to recall past events.

Table 3. Percentage of subjects with past condition based on hospital records or interview history

Condition	Percent with a past condition based on—		Percent difference between interview history and hospital records
	Hospital records (a)	Interview history (b)	$\frac{b - a}{a}$
Malignant Neoplasms:			
Colorectal	5.6 (31)	4.7 (26)	-16
Gastric	2.2 (12)	1.4 (8)	-36
Pulmonary	0.5 (3)	0.7 (4)	+40
Prostatic	1.3 (7)	0.9 (5)	-31
Renal	1.4 (8)	0.7 (4)	-50
All cancers	11.0 (61)	8.4 (47)	-23
Selected conditions:			
Surgery for gallbladder disease	7.8 (43)	8.1 (45)	+ 4
Surgery for peptic ulcer	13.7 (76)	14.5 (80)	+ 6
Colorectal polyp surgery	3.1 (17)	4.7 (26)	+52
Diverticulosis	4.2 (23)	1.4 (8)	-67

NOTE: Number of subjects appears in parentheses.

Table 3 gives the percentage of subjects with a past condition based on hospital records or interview history alone. The information was derived from the data in table 1. The prevalence of the listed conditions, given in column (a), is the result of a systematic review of hospital records. If personal interviews were the only mode of data collection in this study (as shown in column b), then the prevalence of most cancerous conditions would be underreported, along with an overreporting of other surgical conditions. Based on these findings, estimates of risk or prevalence of surgery for gallbladder or peptic ulcer disease should not be misleading in a study or survey if personal interviews were the only data source. However, review of the hospital records revealed limitations in the accuracy of information obtained in a medical history. The findings indicate a need for documentation of the extent of accuracy of personal medical histories, especially those relating to specific cancers, colorectal polypectomy, and diverticulosis.

Summary

The hospital records of 553 men were compared with their medical histories obtained by interviews after hospitalization. Forty men who had documentation of cancer in their hospital records stated that they had the specific condition. However, 21 other cancer patients did not give a positive history of their documented disease and 4 who stated that they had a malignancy did not have cancer according to their hospital records. In contrast to cancer, respondents overreported surgery for peptic ulcer and colorectal

polypectomy. The greatest extent of agreement between the hospital record and the medical interview was noted for surgical patients with gallbladder disease; all 43 of these patients gave a positive history for this condition.

References

1. National Center for Health Statistics: Reporting of hospitalization in the health interview survey. PHS Publication No. 1000, Series 2, No. 6. U.S. Government Printing Office, Washington, D.C., 1965.
2. National Center for Health Statistics: Health interview responses compared with medical records. PHS Publication No. 1000, Series 2, No. 7. U.S. Government Printing Office, Washington, D.C., 1965.
3. National Center for Health Statistics: Interview data on chronic conditions compared with information derived from medical records. PHS Publication No. 1000, Series 2, No. 23. U.S. Government Printing Office, Washington, D.C., 1967.
4. National Center for Health Statistics: Net differences in interview data on chronic conditions and information derived from medical records. PHS Publication No. 1000, Series 2, No. 57. U.S. Government Printing Office, Washington, D.C., 1973.
5. Elinson, J., and Trussel, R. E.: Some factors relating to degree of correspondence for diagnostic information as obtained by household interviews and clinical exams. *Am J Public Health* 47: 311-321 (1957).
6. Sanders, B. S.: Have morbidity surveys been oversold? *Am J Public Health* 52: 1648-1659 (1962).
7. Kaplan, S. D., and Mendelsohn, A. I.: PAS full coverage areas: A resource for epidemiologic research. *J Chronic Dis* 28: 593-599 (1975).
8. Chambers, L. S., et al.: Under-reporting of cancer in medical surveys: A source of systematic error in cancer research. *Am J Epidemiol* 104: 141-145 (1976).